

REMARKS/ARGUMENTS:

Minor changes are made to this specification. Claims 1 and 14 are amended. New claims 21-24 are added. Claims 7-13 are withdrawn. Claims 1-24 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

ELECTION/RESTRICTIONS:

Applicant affirms election without traverse of claims 1-6 and 14-20.

SPECIFICATION:

The Examiner objected to the word "caries" being duplicated on page 10, paragraph 5. In response, the Applicant deleted the duplicate.

In addition, the Examiner indicated that the word "as" needs to be inserted in a sentence on page 11, paragraph 2. In response, the Applicant inserted the word "as" at the location indicated by the Examiner.

Withdrawal of these objections is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 112:

Claims 1-6 and 14-20 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner states,

"Claims 1-6 and 14-20 claim any equivalent of a Competence Stimulating Peptide (CSP) and sucrose that comprises at least 1 substance from the selected group consisting of an orally acceptable carrier, an anti-caries-agent and mixtures thereof. The instant specification does not teach, nor provide neither guidance, nor evidence

original descriptive support for the instantly claimed CSP and sucrose. The specification states that it should be understood that all peptides and proteins having the same or similar function as the CSP peptide encoded by the sequence shown in Fig. 1 (SEQ ID NO: 1) are considered to be functional equivalents of this peptide. The specification teaches SEQ ID NO: 1, but does not teach structure correlated with function."

The Applicant respectfully traverses this rejection. The Applicant's specification at page 17, lines 5-16 and Figure 8 describe an assay for determining how effective a CSP peptide is at preventing the sticking of *S. mutans*. Consequently, a person of ordinary skill in the art would be able to determine if a peptide were a functional equivalent of CSP. However, in order to expedite the prosecution of the instant application, the Applicant amended claim 1 to define CSP as comprising SEQ ID NO:1 or a modification thereof, wherein the CSP is capable of preventing attachment of *S. mutans* to teeth. Claim 14 was similarly amended to define CSP as comprising SEQ ID NO:1 or a modification thereof.

A person of ordinary skill in the art would know how to use modern bioinformatics methods coupled with protein structure modeling software to identify amino acid replacements that are likely to preserve the structure and functional properties of CSP (so called, conservative substitutions). Similarly, those skilled in the art would know how to use such methods to identify other types of conservative modifications of SEQ ID. NO:1, including additions and deletions of amino acids that will not affect CSP structure. After such conservative modifications are identified, only routine experimentation would be required to use the assay of the present invention to determine whether the modified CSP peptide retains its function of reducing attachment of *S. mutans* to teeth.

In view of the foregoing, amended claims 1 and 14 and their dependent claims 2-6 and 15-20 are not indefinite. Withdrawal of this rejection is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 102:

Claims 1-3 and 14-16 stand rejected under 35 U.S.C. § 102(b), as being anticipated by Ooshima, T. et al (Cariostatic activity of cacao mass extract, Archives of oral biology, Sep 2000, 45 (9) p805-8). The Applicant respectfully traverses this rejection.

Claim 1, as amended, is as follows:

A composition comprising an isolated Competence Stimulating Peptide (CSP) and sucrose, wherein the CSP comprises SEQ ID NO:1 or a modification thereof, wherein the CSP is capable of preventing attachment of *S. mutans* to teeth.

Applicant respectfully submits that Ooshima cannot anticipate claim 1, because Ooshima fails to teach a composition comprising Competence Stimulating Peptide (CSP) and sucrose. Ooshima teaches that cacao mass extract (CM) from chocolate has cariostatic activity. (Ooshima, Abstract). Ooshima does not teach CSP.

Ooshima cannot make instant claim 1 obvious. Ooshima has no teaching or suggestion of a composition comprising Competence Stimulating Peptide (CSP) and sucrose. Ooshima teaches CM not CSP.

It is the discovery of the present invention that a composition comprising *S. mutans* Competence Stimulating Peptide (*S. mutans* CSP) and sucrose is effective in the prevention or prophylaxis of dental caries and endocarditis. (Applicant's specification, at page 4, lines 7-11). It is a further discovery of the present invention that the presence of sucrose in any CSP formulation or medicament of this

invention enhances the ability of glucosyltransferase dependent commensal bacteria to adhere. Thus, the combination of CSP and sucrose should both inhibit *S. mutans* attachment as well as facilitate the attachment of non-pathogenic bacteria, thus reducing the useable surface area and opportunity for *S. mutans* attachment. The plaque resulting from the attachment of non-pathogenic bacteria is benign and acts as a barrier for subsequent *S. mutans* attachment. (Applicant's specification, at page 11, lines 8-14).

In light of the foregoing, Applicant respectfully submits that Ooshima could not have anticipated or rendered obvious claim 1, because Ooshima fails to teach or suggest each and every claim limitation. Claims 2-6 depend from claim 1 and cannot be anticipated or rendered obvious for at least the same reasons as claim 1. Withdrawal of these rejections is thus respectfully requested.

Claim 14, as amended, is as follows:

A medicament for the treatment or prophylaxis of a condition associated with the attachment of *S. mutans* to teeth, comprising an isolated CSP in an amount effective to reduce the attachment of *S. mutans* to teeth, wherein the CSP comprises SEQ ID NO:1 or a modification thereof.

Applicant respectfully submits that Ooshima cannot anticipate claim 14, because Ooshima fails to teach a medicament of any kind for the treatment or prophylaxis for reducing the attachment of *S. mutans* to teeth, much less a medicament comprising CSP. As discussed above, Ooshima teaches that cacao mass extract (CM) from chocolate has cariostatic activity. (Ooshima, Abstract). Ooshima fails to teach CSP or the use of CSP in any capacity.

Ooshima cannot make instant claim 14 obvious. Ooshima has no teaching or suggestion of a medicament comprising Competence Stimulating Peptide (CSP).

As discussed above a person of ordinary skill in the art would not arrive at a medicament comprising CSP based upon Ooshima, as Ooshima teaches only cacao mass extract (CM) and fails to teach or suggest any composition or medicament that comprises CSP.

In light of the foregoing, Applicant respectfully submits that Ooshima could not have anticipated or rendered obvious claim 14, because Ooshima fails to teach or suggest each and every claim limitation. Claims 15 and 16 depend from claim 14 and cannot be anticipated or rendered obvious for at least the same reasons as claim 14. Withdrawal of these rejections is thus respectfully requested.

Claims 14, 15, 19, and 20 stand rejected under 35 U.S.C. § 102(b), as being anticipated by Cvitkovitch et al. (U.S. Patent Application Publication 2002/0081302 A1). The Applicant respectfully traverses this rejection.

Applicant respectfully submits that Cvitkovitch cannot anticipate claims 14, 15, 19, and 20, because Cvitkovitch fails to teach a medicament comprising CSP for the treatment or prophylaxis for reducing the attachment of *S. mutans* to teeth.

Cvitkovitch teaches competitive inhibitors of CSP that have been investigated in relation to a method for the treatment of caries. Specifically, compounds that competitively inhibit the binding of CSP to *S. mutans* histidine kinase have been studied. (Applicant's specification, at page 3, lines 14-16). Furthermore, the Examiner acknowledges that "Cvitkovitch et al discloses an invention that relates to a compound that competitively inhibits binding of CSP to *S. mutans* histidine kinase." Thus, Cvitkovitch teaches competitive inhibitors of CSP and not CSP itself.

Cvitkovitch cannot make instant claims 14, 15, 19, and 20 obvious. Cvitkovitch has no teaching or suggestion of a medicament comprising Competence Stimulating Peptide (CSP). As discussed above, Cvitkovitch teaches competitive inhibitors of CSP, completely failing to see the advantage of using CSP itself. Thus

Cvitkovitch completely misses the discovery of the present invention, which is that a composition or medicament comprising *S. mutans* Competence Stimulating Peptide (*S. mutans* CSP) and sucrose is effective in the prevention or prophylaxis of dental caries and endocarditis. Furthermore, the composition of the present invention achieves a completely different result than that taught by Cvitkovitch. The present invention removes *S. mutans* by activating a natural system (Applicant's specification, at page 4, line 28-page 5, line 2), while Cvitkovitch attempts to inhibit this system (Cvitkovitch, paragraph [0022]).

In light of the foregoing, Applicant respectfully submits that Cvitkovitch could not have anticipated or rendered obvious claims 14, 15, 19, and 20, because Cvitkovitch fails to teach or suggest each and every claim limitation. Withdrawal of these rejections is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 1-6 and 14-20 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over Cvitkovitch et al. as applied to claims 14, 15, 19, and 20 above, and further in view of Kuramitsu, H. et al. (Immunological relationships between glucosyltransferase from streptococcus mutans serotypes, Infection and Immunity, Sep 1976, 14 (3)p636-44). The Applicant respectfully traverses this rejection.

Claims 1-6 and 14-20 require using CSP in a composition or medicament. As discussed above Cvitkovitch fails to teach the use of CSP in a composition or medicament. Therefore, claims 1-6 and 14-20 cannot be rendered unpatentable over Cvitkovitch. Kuramitsu cannot remedy the defect of Cvitkovitch and is not relied upon by the Examiner for such. Instead, the Examiner cites Kuramitsu for teaching the sucrose-mediated adherence of cells to glass strains. Specifically, the Examiner states,

"Kuramitsu teaches partially purified glucosyltransferase enzymes for streptococcus mutans that have been utilized to prepare antibodies directed against the soluble glucan-synthesizing activity, GTF-B, and the insoluble-soluble glucan formation. This antibody fraction inhibited both the cell-associated glucosyltransferase activities as well as the sucrose-mediated adherence of cells to glass."

Furthermore, Kuramitsu, similar to Cvitkovitch, attempts to inhibit a natural system, while the present invention, as discussed above, seeks to activate this system.

In light of the foregoing, Applicant respectfully submits that the cited references could not have rendered obvious claims 1-6 and 14-20, because the cited references fail to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

The art made of record but not relied upon by the Examiner has been considered. However, it is submitted that this art neither describes nor suggests the presently claimed invention.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.


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If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
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